DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1, 3-7, and 9-16 is rejected under 35 U.S.C. 103(a) as being unpatentable

over Le Scolan et al. (USP 7,058,729) in view of Kotaki (USP 5,276,659).

Regarding Claim 1, Le Scolan discloses a computer node (**see Fig. 2, Synchronization**

nodes "Cma") for operating in a system comprising a plurality of network clusters (**See**

Fig. 2 & Col. 5 lines 32-33 i.e., "first, second network"), wherein a number of

network clusters comprise a plurality of computer nodes (**see Col. 11 lines 5-8**), the

computer node comprising:

a synchronization unit (**See Fig. 2, nodes A,B**) for comparing network timing

information (**see Col. 12 lines 17-31 i.e., reference time**) for a first network with

network timing information for a second network (**see Col. 15 lines 10-31**)

and for communicating to other computer nodes in the first network a sign of the

difference (**see Col. 15 line 32 *i.e., offset supplied as a number of clock pulses***)

between the first network timing information and the second network timing information

to allow the other computer nodes in the first network to alter their network timing

information directed by the sign of the difference, (**see Col. 15 lines 32-48 i.e., *"CMb"***

makes a correction in its cycle time register CTR in order to remain synchronized

with the synchronization node "CMa" and then sends to all the nodes on

communication bus "bB" (i.e., first network), cycle start signals in order to

synchronize the different clocks of the nodes with the clock of the node "CMb")

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to

the difference of reference time events between to buses "bA" and "bB" which are

compared and communicated to cycle masters "Cma" and "Cmb" through respective

interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one

another by reading and calculating each of their respective clock pulses (*i.e., network*

timing information) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5**

lines 1-18).

Le Scolan does not disclose wherein a network timing difference between the first

network and the second network is reduced responsive to the sign of the difference

received and in sufficiently small predetermined step values in accordance with the sign

to avoid loss of local synchronization with the other computer nodes in the first network,

however the limitation is known in the art of communications by evidence of Kotaki

(USP 5,726,659)

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o
and multiple slave stations "11i....11n", where *the master station finding a delay or gain
time from time information sent from the slave station for each given time and reference
time, finding a time correction coefficient and time correction number of the respective
slave station on the basis of the given time and delay or gain time, and transmitting the
time correction coefficient and time correction number to the slave station; and the
respective slave station, responsive to each timer check signal of its internal timer, for
calculating the time correction coefficient and time check signal sent from the master
station to obtain a correction timer check signal, comparing a time correction number
sent from the master station and its own time correction number, repeating a time
correction operation until there occurs a coincidence between the two, and correcting a
time difference between a reference time of the master station and an internal time of
the respective slave station, a plurality of times, upon receipt of each timer check signal,*
(**see Col. 2 lines 3-30**).

Kotaki discloses a network timing difference between a master station and a respective
slave station (**see Col. 3 lines 8-12 i.e., timing difference |e|**) is corrected (*i.e.,
reduced or increased*) responsive to the sign of the difference received, (**see Col. 3 line
55 - Col. 4 lines 1-10**)

and in sufficiently small predetermined step values (**see Col. 3 lines 20-45** *i.e.,
predetermined time correction number N is assigned based on timing difference
|e|, and a correction coefficient D*) in accordance with the sign (***see Col. 4 lines 25-***

51 i.e., time synchronization can be obtained between the master station and the

slave station after 10 system times (small steps)).

Kotaki teaches *since the time correction coefficient and time correction number as*

found based on the time difference of the respective slave station are sent to the slave

station, it is possible to perform time correction at the respective slave station upon

receipt of the time correction data. Further, the respective slave station can secure time

synchronization (i.e., avoid local loss), while very small step like time correction is being

done, enabling a proper processing or a smoother operation to be obtained in various

control operations, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the

invention for a network timing difference between the first network and the second

network to be reduced responsive to the sign of the difference received and in

sufficiently small predetermined step values in accordance with the sign to avoid loss of

local synchronization with the other computer nodes in the first network, by including the

teachings of Kotaki who discloses a network timing difference between a master station

and a respective slave station from a plurality of slave stations, is corrected responsive

to the sign of the difference received and in sufficiently small predetermined step values

in accordance with the sign, within the teachings of Le Scolan who discloses comparing

network timing information for a first network with network timing information for a

second network using a synchronization unit, and for communicating to other computer

nodes in the first network a sign of the difference between the first network timing

information and second network timing information to allow the other computer nodes in

the first network to alter their network timing information directed by the sign of the

difference, because the teaching lies in Kotaki, that a slave station can secure time

synchronization while very small step like time correction is being done, enabling a

proper processing or a smoother operation to be obtained in various control operations.

Regarding Claim 3, the combination of Le Scolan in view of Kotaki disclose, a computer

node according to claim 1, wherein the network timing information corresponds to the

phase of the network clock, (**Referring to Fig. 1 Le Scolan illustrates the phase**

offset in the computer node, see Col. 20 lines 24-40)

Regarding Claim 4, the combination of Le Scolan in view of Kotaki disclose a computer

node according to claim 1, wherein the synchronization unit is arranged to provide the

sign of the difference to the second network to allow the second network to alter its

network timing information to allow the network timing difference between the first

network and the second network to be reduced, (**The difference is calculated and**

synchronization is performed to the applied network, see Le Scolan, Col. 6 lines

38-60).

Regarding Claim 5, the combination of Le Scolan in view of Kotaki disclose, a computer

node according to claim 1, wherein the computer node is arranged to be coupled to the

first network, (**The first and second network described in Col. 5 lines 59-61, are**

illustrated by Le Scolan in Fig. 2, where node "B" is coupled to the first network).

Regarding Claim 6, the combination of Le Scolan in view of Kotaki, disclose a computer

node according to claim 1, wherein the computer node is arranged to be coupled to the

second network via a second computer node, (**The first and second network**

described in Col. 5 lines 59-61, are illustrated by Le Scolan in Fig. 2, where node

"A" is coupled to the second network).

Regarding Claim 7, Le Scolan discloses a system comprising a plurality of network

clusters comprising:

a first network, a second network, (**See Fig. 2 & Col. 5 lines 25-33 i.e., "first, second**

network"),

a computer node having a synchronization unit (**See Fig. 2, nodes A,B**) for comparing

network timing information (**see Col. 12 lines 17-31 i.e., reference time**) for the first

network with network timing information for the second network (**see Col. 15 lines 10-**

31) and for communicating to other computer nodes in the first network a sign of the

difference between the first network timing information and the second network

timing information (**see Col. 15 lines 32-48 i.e., *"CMb" makes a correction in its cycle time register CTR in order to remain synchronized with the synchronization node "CMa" and then sends to all the nodes on communication bus "bB" (i.e., first network), cycle start signals in order to synchronize the different clocks of the nodes with the clock of the node "CMb"***)

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to the difference of reference time events between to buses "bA" and "bB" which are compared and communicated to cycle masters "Cma" and "Cmb" through respective interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one another by reading and calculating each of their respective clock pulses (*i.e., network timing information*) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5 lines 1-18**).

Le Scolan does not disclose that a network timing difference between the first network and the second network is reduced by the other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the other computer nodes in the first network, the reduction of the timing differences being directed by the sign of the network timing difference between the first network and the

second network, however the limitation is known in the art of communications by

evidence of Kotaki (USP 5,726,659).

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o

and multiple slave stations "11i....11n", where *the master station finding a delay or gain*

time from time information sent from the slave station for each given time and reference

time, finding a time correction coefficient and time correction number of the respective

slave station on the basis of the given time and delay or gain time, and transmitting the

time correction coefficient and time correction number to the slave station; and the

respective slave station, responsive to each timer check signal of its internal timer, for

calculating the time correction coefficient and time check signal sent from the master

station to obtain a correction timer check signal, comparing a time correction number

sent from the master station and its own time correction number, repeating a time

correction operation until there occurs a coincidence between the two, and correcting a

time difference between a reference time of the master station and an internal time of

the respective slave station, a plurality of times, upon receipt of each timer check signal,

(see Col. 2 lines 3-30).

Kotaki discloses a network timing difference between a master station and a respective

slave station **(see Col. 3 lines 8-12 i.e., timing difference |e|)** is corrected (*i.e.,*

reduced or increased) responsive to the sign of the difference received, **(see Col. 3 line**

55 - Col. 4 lines 1-10)

and in sufficiently small predetermined step values (**see Col. 3 lines 20-45** *i.e.,*

predetermined time correction number N is assigned based on timing difference

|e|, and a correction coefficient D) in accordance with the sign (**see** *Col. 4 lines 25-*

51 i.e., time synchronization can be obtained between the master station and the

slave station after 10 system times (small steps)).

Kotaki discloses the reduction of the timing differences being directed by the sign of the

network timing difference, (**see Col. 2 lines 10-30 i.e.,** ***respective slave station***

repeats a time correction operation by reducing the time difference if the master

station finds a gain time from the time information or increasing the time

difference if the master station finds a delay from the time information)

Kotaki teaches *since the time correction coefficient and time correction number as*

found based on the time difference of the respective slave station are sent to the slave

station, it is possible to perform time correction at the respective slave station upon

receipt of the time correction data. Further, the respective slave station can secure time

synchronization (i.e., avoid local loss), while very small step like time correction is being

done, enabling a proper processing or a smoother operation to be obtained in various

control operations, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the

invention for having the network timing difference between the first network and the

second network reduced by the other computer nodes in the first network responsive to

the sign of the difference received and in sufficiently small predetermined step values in

accordance with the sign to avoid loss of local synchronization with the other computer

nodes in the first network, the reduction of the timing differences being directed by the

sign of the network timing difference between the first network and the second network,

by including the teachings of Kotaki who discloses a network timing difference between

a master station and a respective slave station from a plurality of slave stations is

corrected responsive to the sign of the difference received and in sufficiently small

predetermined step values in accordance with the sign, within the teachings of Le

Scolan who discloses a first and second network, a computer node having a

synchronization unit for comparing network timing information for a first network with

network timing information for a second network, and for communicating to other

computer nodes in the first network a sign of the difference between the first network

timing information and second network timing information, because the teaching lies in

Kotaki, that a slave station can secure time synchronization while very small step like

time correction is being done, enabling a proper processing or a smoother operation to

be obtained in various control operations.

Regarding Claim 9, the combination of Le Scolan in view of Kotaki disclose a system

according to claim 7, wherein the first network has a plurality of nodes (**Referring to**

Fig. 2, Le Scolan illustrates Node A in the first network contains a plurality of

nodes) See Col. 11 Lines 6-8.

and the first network timing information is used to maintain synchronization of the

plurality of nodes, (**The synchronized networks are described to be maintained, Le**

Scolan, See Col. 5 Lines 55-58).

wherein the change in network timing information is sufficiently small to allow the

plurality of nodes to maintain synchronization should one of the plurality of nodes not

change its timing information in response to the sign of the difference communicated by

the computer node, (**Kotaki, see Col. 4 line 63 – Col. 5 lines 1-5**).

Regarding Claim 10, Le Scolan discloses a method for allowing synchronization of a

first network and a second network in a system comprising a plurality of network

clusters(**See Fig. 2 & Col. 5 lines 25-33 i.e., "first, second network"**), wherein a

number of network clusters comprise a plurality of computer nodes (**see Col. 10 lines**

26-30 i.e., "other nodes" connected to sync node (Fig. 2 Item "CMa")), the method

comprising:

comparing network timing information (**see Col. 12 lines 17-31 i.e., reference time**)

for the first network with network timing information for the second network (**see Col. 15**

lines 10-31) communicating to other computer nodes in the first network a sign of the

difference between the first network timing information and the second network

timing information (**see Col. 15 lines 32-48 i.e., "*CMb*" makes a correction in its cycle time register CTR in order to remain synchronized with the synchronization node "CMa" and then sends to all the nodes on communication bus "bB" (i.e., first network), cycle start signals in order to synchronize the different clocks of the nodes with the clock of the node "CMb"**)

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to the difference of reference time events between to buses "bA" and "bB" which are compared and communicated to cycle masters "Cma" and "Cmb" through respective interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one another by reading and calculating each of their respective clock pulses (*i.e., network timing information*) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5 lines 1-18**).

Le Scolan does not disclose that a network timing difference between the first network and the second network is reduced by the other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the other computer nodes in the first network, the reduction of the timing differences being directed by the sign of the network timing difference between the first network and the

second network, however the limitation is known in the art of communications by

evidence of Kotaki (USP 5,726,659).

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o

and multiple slave stations "11i....11n", where *the master station finding a delay or gain*

time from time information sent from the slave station for each given time and reference

time, finding a time correction coefficient and time correction number of the respective

slave station on the basis of the given time and delay or gain time, and transmitting the

time correction coefficient and time correction number to the slave station; and the

respective slave station, responsive to each timer check signal of its internal timer, for

calculating the time correction coefficient and time check signal sent from the master

station to obtain a correction timer check signal, comparing a time correction number

sent from the master station and its own time correction number, repeating a time

correction operation until there occurs a coincidence between the two, and correcting a

time difference between a reference time of the master station and an internal time of

the respective slave station, a plurality of times, upon receipt of each timer check signal,

(see Col. 2 lines 3-30).

Kotaki discloses a network timing difference between a master station and a respective

slave station **(see Col. 3 lines 8-12 i.e., timing difference |e|)** is corrected (*i.e.,*

reduced or increased) responsive to the sign of the difference received, **(see Col. 3 line**

55 - Col. 4 lines 1-10)

and in sufficiently small predetermined step values (**see Col. 3 lines 20-45** *i.e.,*

predetermined time correction number N is assigned based on timing difference

|e|, and a correction coefficient D) in accordance with the sign (**see** *Col. 4 lines 25-*

51 i.e., time synchronization can be obtained between the master station and the

slave station after 10 system times (small steps)).

Kotaki discloses the reduction of the timing differences being directed by the sign of the

network timing difference, (**see Col. 2 lines 10-30 i.e.,** *respective slave station*

repeats a time correction operation by reducing the time difference if the master

station finds a gain time from the time information or increasing the time

difference if the master station finds a delay from the time information)

Kotaki teaches *since the time correction coefficient and time correction number as*

found based on the time difference of the respective slave station are sent to the slave

station, it is possible to perform time correction at the respective slave station upon

receipt of the time correction data. Further, the respective slave station can secure time

synchronization (i.e., avoid local loss), while very small step like time correction is being

done, enabling a proper processing or a smoother operation to be obtained in various

control operations, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the

invention for having the network timing difference between the first network and the

second network reduced by the other computer nodes in the first network responsive to

the sign of the difference received and in sufficiently small predetermined step values in

accordance with the sign to avoid loss of local synchronization with the other computer

nodes in the first network, the reduction of the timing differences being directed by the

sign of the network timing difference between the first network and the second network,

by including the teachings of Kotaki who discloses a network timing difference between

a master station and a respective slave station from a plurality of slave stations is

corrected responsive to the sign of the difference received and in sufficiently small

predetermined step values in accordance with the sign, within the teachings of Le

Scolan who discloses comparing network timing information for the first network with

network timing information for the second network, and for communicating to other

computer nodes in the first network a sign of the difference between the first network

timing information and second network timing information, because the teaching lies in

Kotaki, that a slave station can secure time synchronization while very small step like

time correction is being done, enabling a proper processing or a smoother operation to

be obtained in various control operations.

Regarding Claim 11, the combination of Le Scolan in view of Kotaki, disclose a

computer node according to claim 1, wherein the first network comprises a first

communication cycle and the second network comprises a second network cycle, (**Le

Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second

network timing information indicates that the first communication cycle is ahead of the

second communication cycle. (**Le Scolan, see Col. 15 lines 10-48 i.e.,** *node CMb*

makes a correction to the value contained in its cycle time register in order to

remain synchronized (i.e., increase or decrease timing) with the synchronization

node "CMA".

(**Kotaki**, **see Col. 2 lines 10-30 i.e.,** *respective slave station repeats a time*

correction operation by reducing the time difference if the master station finds a

gain time (ahead) from the time information or increasing the time difference if

the master station finds a delay from the time information)

Regarding Claim 12, the combination of Le Scolan in view of Kotaki, disclose a

computer node according to claim 1, wherein the synchronization unit is

arranged to measure a time between a start of a first communication cycle of the first

network and a start of a second communication cycle of the second network, (**Le**

Scolan, see Col. 12 lines 17-67 i.e., *interconnection nodes A, B read and update*

(measure) cycle start signals)

Regarding Claim 13, the combination of Le Scolan in view of Kotaki, disclose a system

according to claim 7, wherein the first network comprises a first communication cycle

and the second network comprises a second network cycle, (**Le Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second network timing information indicates that the first communication cycle is ahead of the second communication cycle, (**Le Scolan, see Col. 15 lines 10-48 i.e., *node CMb makes a correction to the value contained in its cycle time register in order to remain synchronized (i.e., increase or decrease timing) with the synchronization node "CMA".***

(**Kotaki, see Col. 2 lines 10-30 i.e., *respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time (ahead) from the time information or increasing the time difference if the master station finds a delay from the time information)***

Regarding Claim 14, the combination of Le Scolan in view of Kotaki disclose a system according to claim 7, wherein the synchronization unit is arranged to measure a time between a start of a first communication cycle of the first network and a start of a second communication cycle of the second network, (**Le Scolan, see Col. 12 lines 17-67 i.e., *interconnection nodes A, B read and update (measure) cycle start signals*)**

Regarding Claim 15, the combination of Le Scolan in view of Kotaki disclose a method according to claim 10, wherein the first network comprises a first communication cycle and the second network comprises a second network cycle, (**Le Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second network timing information indicates that the first communication cycle is ahead of the second communication cycle, (**Le Scolan, see Col. 15 lines 10-48 i.e., *node CMb makes a correction to the value contained in its cycle time register in order to remain synchronized (i.e., increase or decrease timing) with the synchronization node "CMA".***

(**Kotaki, see Col. 2 lines 10-30 i.e., *respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time (ahead) from the time information or increasing the time difference if the master station finds a delay from the time information*)

Regarding Claim 16, the combination of Le Scolan in view of Kotaki disclose a method according to claim 10, wherein the synchronization unit measures a time between a start of a first communication cycle of the first network and a start of a second communication cycle of the second network, (**Le Scolan, see Col. 12 lines 17-67 i.e., *interconnection nodes A, B read and update (measure) cycle start signals*)

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ADNAN BAIG whose telephone number is (571) 270-

7511. The examiner can normally be reached on Mon-Fri 7:30m-5:00pm eastern Every

other Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ADNAN BAIG/
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